

Work Order ID 137870

Wednesday, October 14, 2015 11:22:14 AM

137870

U/R

Page 1

Item ID: D412-664-403 Accept ***N900040100*** Setup Start ***NS1***
 Revision ID: URF 15-561 Stop ***NS2***
 Item Name: 412 Stainless Steel Aft Crosstubes - High
 Start Date: 10/14/2015 Start Qty: 1.00 ***1*** Cust Item ID:
 Required Date: 10/14/2015 Req'd Qty: 1.00 ***1*** Customer:
 Reference:

Approvals: Process Plan: ML3 Date: OCT 14 2015 Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D412-664-443	A U/R <u>Q 15/11/16</u>								
100	Document Control	0.00							
100	DOCUMENT CONTROL								
DC	Memo	0.00							
Doc.Control -USB or Paperwork	Photocopy bluefile & type labels per PPPD412-664-403		CHG001						
110	BENDING MACHINE - CROSSTUBES	0.00							
110									
CNC Bend 2	Memo	0.03							
CNC Alpha 160 Bender	Bend tube as per Dwg D412-664-443 using CNC bender program _____ and Folio FT _____								
	****USE (4) DT9824 SHIM BLOC TO CHECK STRAIGHTNESS****								
127	QC15- Crosstube Dimensional Check	0.00							
127									
QC	Memo	0.00							
Quality Control	***MARK CUT LINES***								

IX DAS 28 NOV 03 2015
3-89

TH 15-10-19

DAS 49 15/10/19
9-89

412-664-403 / 137870

Work Order ID 137870

137870

Page 2

Wednesday, October 14, 2015 11:22:14 AM

Item ID: D412-664-403 Accept ***N900040100*** Setup Start ***NS1***
Revision ID: URF 15-561 Stop ***NS2***
Item Name: 412 Stainless Steel Aft Crosstubes - High
Start Date: 10/14/2015 Start Qty: 1.00 ***1*** Cust Item ID:
Required Date: 10/14/2015 Req'd Qty: 1.00 ***1*** Customer:
Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
128		0.00							
128									
Crosstubes	Memo	0.01							
Crosstubes	CUT TUBE AT HEIGHT ON FAI SHEET								
	VERF HEIGHT <u>24.37</u> BY QC 15 LEVEL INSPECTOR <u>mark</u>								
	VERF TWIST <u>080</u> BY QC15 LEVEL INSPECTOR <u>mark</u>								
130		0.00							
130									
Crosstubes		0.03							
Crosstubes	Memo								
	1- Drill Tube as per Dwg D412-664-443 Using DT _____ Drill Jigs, Set-up drill table as per QSI 010								
	2 -Deburr								
	3- Engrave Part # and Batch # as per Dwg D412-664-443								
	4-Remove all marks from tube within limits of D412-664-43 DWG								

Handwritten notes:
15-10-20
15-10-21

Wednesday, October 14, 2015 11:22:14 AM

Page 3

Stop *NS2*

Customer:

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____
QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Run Start *NR1*

Stop ***NR2***

[illegible]

174 Outsource process - NDT per QSI038 4.1 0.00

174 **Memo** 3.00

Outsource2 ISSUE P/O TO ACCUREN: 30242

Outsource process - NDT

CZ OCT 23 2015 1

176	Receive & Inspect for Damage & Mat'l Certs	0.00	
176			
Packaging	Memo	0.00	
Packaging			

Work Order ID 137870

Wednesday, October 14, 2015 11:22:14 AM

137870

Page 4

Item ID: D412-664-403 Accept ***N900040100*** Setup Start ***NS1***
Revision ID: URF 15-561 Stop ***NS2***
Item Name: 412 Stainless Steel Aft Crosstubes - High
Start Date: 10/14/2015 Start Qty: 1.00 ***1*** Cust Item ID:
Required Date: 10/14/2015 Req'd Qty: 1.00 ***1*** Customer:
Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
178	QC5- Inspect part completeness to step on W/O	0.00							
178									
QC	Memo	0.00				1			EB 15-10-29
Quality Control									
180		0.00							
180									
SprayPaint	SprayPaint	0.01				1			DAS 41 9-89 15-10-29
Spray Painting	Memo								
	1-Prime inside & outside crosstube as per QSI 005 4.2 BATCH: <u>133084</u>								
	2- MASK UNDERSIDE OF CROSSTUBE AS SHONE ON DWG BEFORE PAINTING								
	3 -Paint Outside of Tube as per Dart QSI 005 4.2 BATCH: <u>133325</u>								
	4- After painting remove masking and apply matte clear coat per QSI005 4.2 CLEAR BATCH: <u>132664</u>								

137870

Wednesday, October 14, 2015 11:22:15 AM

N900040100

Setup Start *NS1*

Stop *NS2*

Start Date: 10/14/2015 **Start Qty:** 1.00 ***1***

Required Date: 10/14/2015 **Req'd Qty:** 1.00 *** 1 ***

Reference:

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

Run Start *NR1*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

**Insp.
Stamp**

0.00

190

0.00

5/15/03

OC

Memo

Quality Control

Work Order ID 137870

137870

Page 6

Wednesday, October 14, 2015 11:22:15 AM

Item ID: D412-664-403 Accept ***N900040100*** Setup Start ***NS1***
Revision ID: URF 15-561 Stop ***NS2***
Item Name: 412 Stainless Steel Aft Crosstubes - High
Start Date: 10/14/2015 Start Qty: 1.00 ***1*** Cust Item ID:
Required Date: 10/14/2015 Req'd Qty: 1.00 ***1*** Customer:
Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
200		0.00							DAS
200	Crosstubes					1			41
Crosstubes		0.01							9-89
Crosstubes	★ SEE Attached Memo 1- Install center support using scoth-weld DP460 per QSI 015, as per DWG. note 12. Install supports clamps using as per Dwg D412-644-443. Install clamp with rubber cushion as per DWG. note 13. ***ENSURE CLAMPS ARE ON TOP OF CROSSTUBE SUPPORT*** Torque clamps on support to 80-100 IN-LBS AS PER DWG. A/R scoth-weld DP460 BATCH #: <u>132895</u> EXP DATE: <u>8/16</u> 2- **IF NOT ALREADY PRESENT ON CHAFFING SHEILD.** Apply a thin coat of proseal 890 per QSI 015 on inside concave surface of chafing shield and let cure per manufacturer's instructions. Install prosealed chafing shield onto crosstube by applying a thin coat of proseal 890 onto crosstube. Be sure to eliminate any air gaps. Install and torque clamps on chafing shield to 40-50 IN-LBS AS PER DWG. A/R Proseal 890 Batch: <u>133071</u> EXP DATE: <u>2/16</u> AFTER FINISH CURE TIME 24H START CURE TIME: <u>15-10-30</u> FINISH CURE TIME: <u>15-10-31</u> PRIOR TO PACKAGING RE-CHECK TORQUE ON CLAMPS AFTER CURED FOR 24H.							15-10-30	

Re adjusted clamps
8/15/103.

Re Adjusted clamps
8/11/03.

Work Order ID 137870

137870

Page 8

Wednesday, October 14, 2015 11:22:15 AM

Item ID: D412-664-403 Accept ***N900040100*** Setup Start ***NS1***
Revision ID: URF 15-561 Stop ***NS2***
Item Name: 412 Stainless Steel Aft Crosstubes - High
Start Date: 10/14/2015 Start Qty: 1.00 ***1*** Cust Item ID:
Required Date: 10/14/2015 Req'd Qty: 1.00 ***1*** Customer:
Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
240		0.00							
240	Packaging					<u>IX</u>	<u>SMB</u>	DAS	NOV 0 3 2015
Packaging	Memo	0.00						28	
Packaging	Identify and pack for shipping as per PPPD412-664-443							9-89	
	Location: <u>SMB</u>								
	PPP Rev: <u>SMB</u>								
250	QC21- Final Inspection - Work Order Release	0.00							NOV 0 4 2015
250									
QC	Memo	0.00							<u>MCS</u>
Quality Control									

MCS NOV 0 4 2015

Wednesday, October 14, 2015 11:22:18 AM

137870

D412-664-403

Required Qty: 1.00

Comments: IPP REV:A 13.10.25 NEW ISSUE DD VERF:JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D412-664-443TRN		Manufactured	No			110	Each	0.0000	1	1			
D412-664-443TRN													
Crosstube Turning Detail													
D3595-063-530		Manufactured	No			200	Each	98.0000	2	2			
D3595-063-530													
Rubber Cushion 0.63" wide x 5.30" Long													
				<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>					
				FG		1							
				82656		1							
				LG051		97							
				115704		22				2			
				132515		75							
D4909-1		Manufactured	No			200	Each	12.0000	1	1			
D4909-1													
Support													
				<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>					
				LG053		12							
				130094		2				1			
				135507		10							
D4910-1		Manufactured	No			200	Each	12.0000	2	2			
D4910-1													
Chaffing Shield													
				<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>					
				LG054		12							
				134367		2							
				135444		10				2			

Picklist Print

Wednesday, October 14, 2015 11:22:18 AM

Page 2

Work Order ID: 137870

137870

Parent Item: D412-664-403

D412-664-403

Parent Item Name: 412 Stainless Steel Aft Crosstubes - High

Start Date: 10/14/2015

Required Date: 10/14/2015

Start Qty: 1.00

Required Qty: 1.00

MS21920-26

Purchased

No

200

Each

18.0000

4

4

DAS

41

9-89

15-10-30

MS21920-26

Clamp

**

Location

Loc Qty

Loc Code

LG050

8

109206

6

M132045

2

LG057

10

M133234

10

4

MS21920-28

Purchased

No

200

Each

184.0000

2

2

DAS

41

9-89

15-10-30

MS21920-28

Clamp

**

Location

Loc Qty

Loc Code

FG

1

105884

1

LG050

126

M130400

50

M130665

2

M133090

38

M133091

36

LG051

57

M132169

19

M132522

38

AN6-40A

Purchased

No

220

Each

144.0000

4

4

DAS
26
9-89

DAS

26

9-89

AN6-40A

3/8-24 BOLT X 3"LONG

**

Location

Loc Qty

Loc Code

ST286A

144

M131618

20

M131803

100

M133316

24

4

DAS
28
9-89

15-11-05

Wednesday, October 14, 2015 11:22:18 AM

Shop Packet Print

Page 2

Wednesday, October 14, 2015 11:22:18 AM

137870

D412-664-403

Required Date: 10/14/2015

Required Qty: 1.00

2

DAS 26 9-89

DAS
28
9-89

Loc Code

60

11

18

28

6

DAS
26
9-89

DAS
28
9-89

Loc Code

100

143

1

4

100

17

17

18-11-03

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

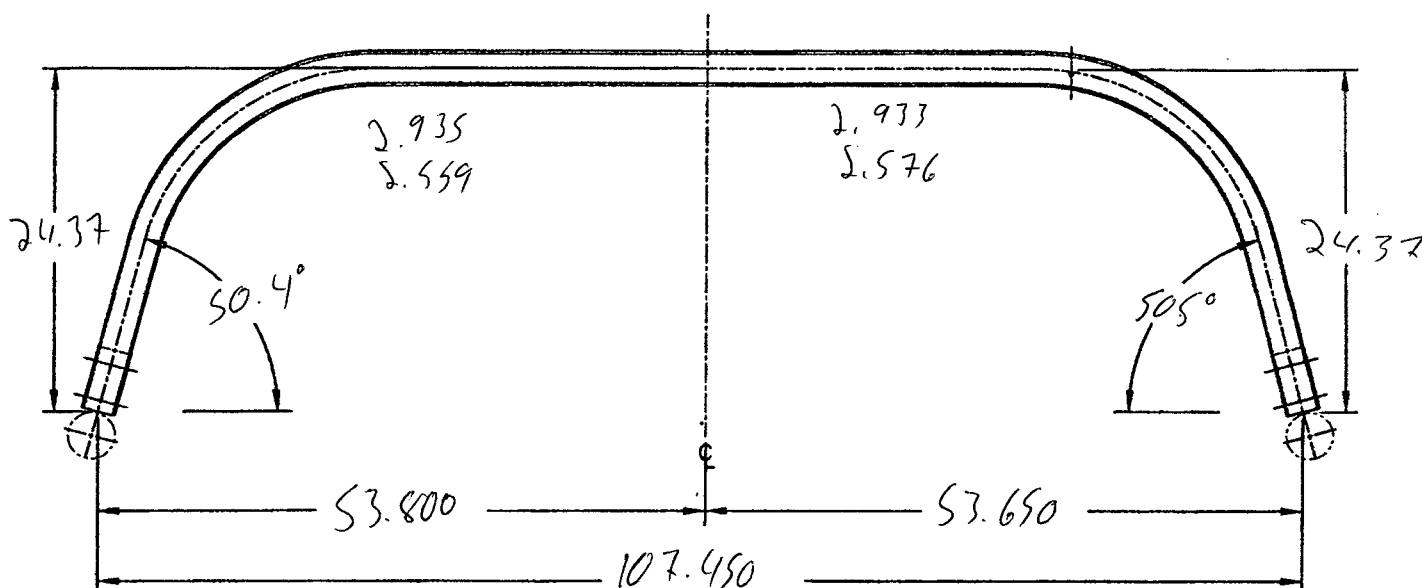
QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐			
Date : _____	Step #: _____	QTY Effective : _____		MRB (QS1042) Approval	
Description Work Order Deviation			Disposition		
			Completed By		
			Lead hand / Supervisor Approval Verification		
			QC / QA Coordinator Approval		
Root Cause Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐ No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐		FAULT CATEGORY Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐ Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐ Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Mislabelled ☐ Fit/Function ☐ Misaligned/off center ☐ Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐			
☐ OTHER : _____					

DART AEROSPACE LTD		Work Order:	
Description: Crosstube High Aft (412)		Part Number:	D412-664-403
Inspection Dwg: D412-664-443 Rev: A			Page 1 of 1

Required Dimension	Min	Max
Height	24.12	24.62
1/2 Span	53.56	53.82
Angle	49°	52°
Total Span	107.12	107.64
Bending Passes	8	--
Crushing	--	7%



	Side A	Side B
Bending Passes	4	4
Crushing	6.9%	6.4%
Comments		

QC15 Inspection	DAS
Date	49 15/10/17

Rev	Date	Change	Revised by	Approved
A	14.07.08	New Issue	KJ	UP

Item	Qty -443	Part Number	Description
1	X	D412-664-443	CROSSTUBE ASSEMBLY (412 HI AFT)
2	1	D6020-132	CROSSTUBE MATERIAL (132" MIN. LENGTH)
3	2	D3595-063-530	RUBBER CUSHION
4	1	D4909-1	SUPPORT
5	2	D4910-1	CHAFING SHIELD
7	4	MS21920-26	CLAMP
8	2	MS21920-28	CLAMP
9	A/R	SCOTCH-WELD DP460	EPOXY ADHESIVE, 3M SCOTCH-WELD
10	A/R	PROSEAL 890	SEALANT

GENERAL NOTES:

- MATERIAL: MANUFACTURED FROM D6020-132
FINISHED LENGTH = 130.10±0.060 (BEFORE BENDING/TRIMMING)
 - FINISH: PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (ZN C6-2, HATCHED AREA)
PAINT OUTSIDE PER DART QSI 005 4.2
AFTER PAINTING, REMOVE MASKING AND APPLY MATTE CLEAR COAT PER DART QSI 005 4.2
 - TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
 - UNITS: INCHES UNLESS OTHERWISE NOTED.
 - BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
 - IDENTIFICATION: SCRIBE DART P/N "D412-664-443" AND B/N ON INSIDE OF CUFF PER DART QSI 044 6.4 (VIBRATING STYLUS)
 - WEIGHT: 80.2 lb AFTER MACHINING
88.7 lb FINISHED WEIGHT
 - PART IS SYMMETRIC ABOUT CENTERLINE.
 - EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- BENDING**
- BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 7% (BASED ON O.D.) IN LOWER HALF OF R35 BEND AND 6% (BASED ON O.D.) ON REMAINING TUBE.
 - LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038. TO BE PERFORMED AFTER FINAL POST-BEND GRINDING. ANY ADDITIONAL GRINDING REQUIRES ANOTHER LPI INSPECTION.

ASSEMBLY

- INSTALL D4909-1 CENTER SUPPORT USING A 0.04" TO 0.07" THICK LAYER OF SCOTCH-WELD DP460 PER QSI 015.
- INSTALL MS21920-28 CLAMPS WITH D3595-063-530 RUBBER CUSHIONS TO SECURE THE D4909-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE ON TOP OF CROSSTUBE SUPPORT.
- IF NOT ALREADY PRESENT ON CHAFING SHIELD, APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D4910-1 CHAFING SHIELD AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL PROSEALED D4910-1 CHAFING SHIELD ONTO CROSSTUBE BY APPLYING A THIN COAT OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.
- TORQUE CLAMPS ON D4909-1 SUPPORT 80 TO 100 IN-LB. TORQUE CLAMPS ON D4910-1 CHAFING SHIELD 40 TO 50 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVES HAVE CURED FOR 24 HOURS.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 137870 MJS
15-10-14

UNDER REVIEW

4/15/14
LRF 15-561

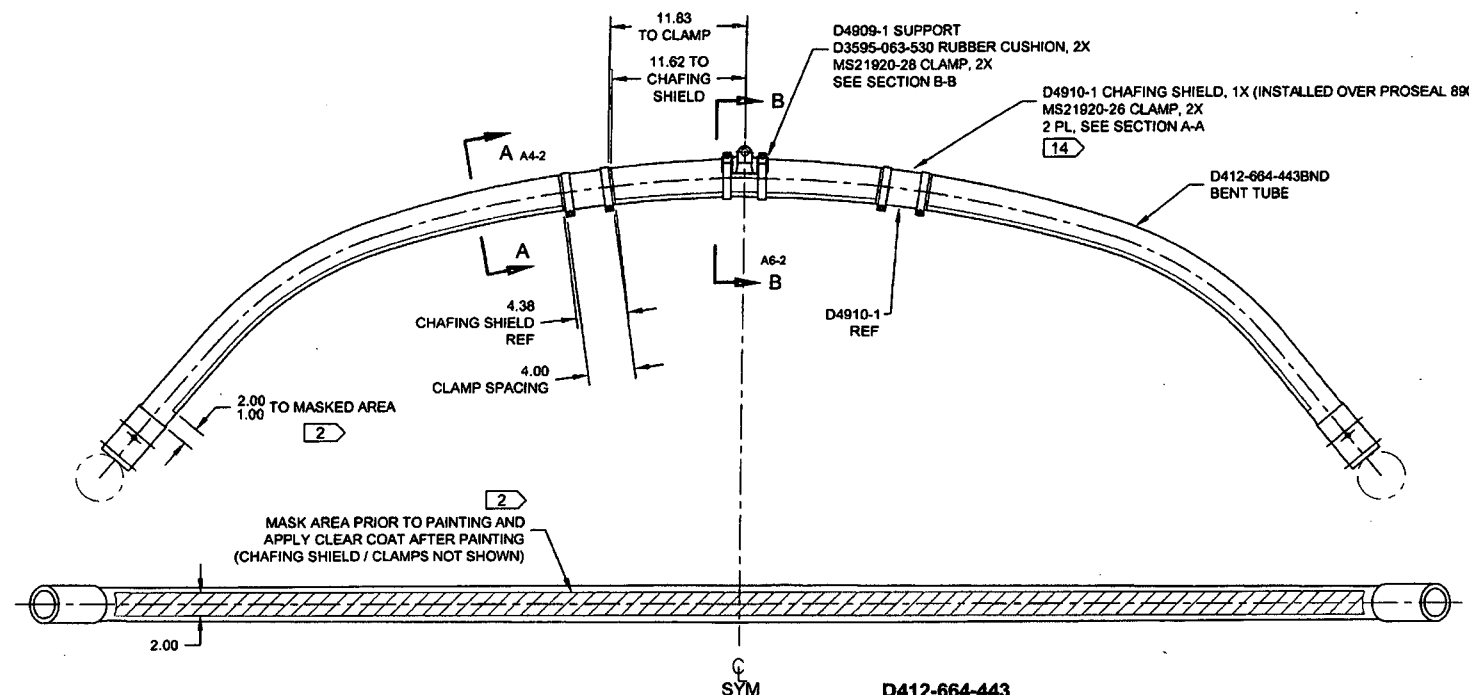
UNDER REVIEW

4/17/14
LRF 15-691

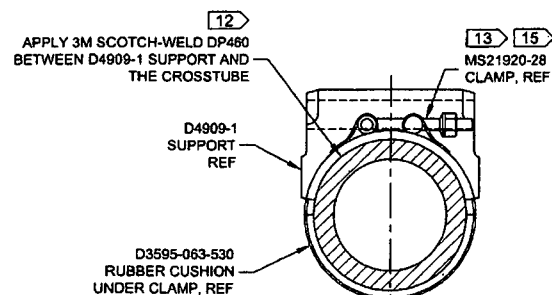
RELEASED
2014-05-26

A	NEW ISSUE	CP	14.04.01
REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN			
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	14.04.01		

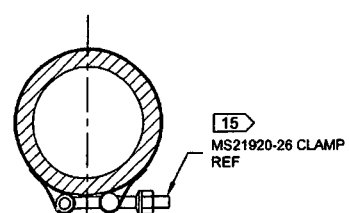
DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWING NO. D412-664-443	REV. A SHEET 1 OF 4
TITLE CROSSTUBE ASSY (412 HI AFT)	SCALE NTS
COPYRIGHT © 2013 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS UNDERSTANDING THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	



D412-664-443
ASSEMBLY DETAIL



SECTION B-B D4-2
SCALE 4X



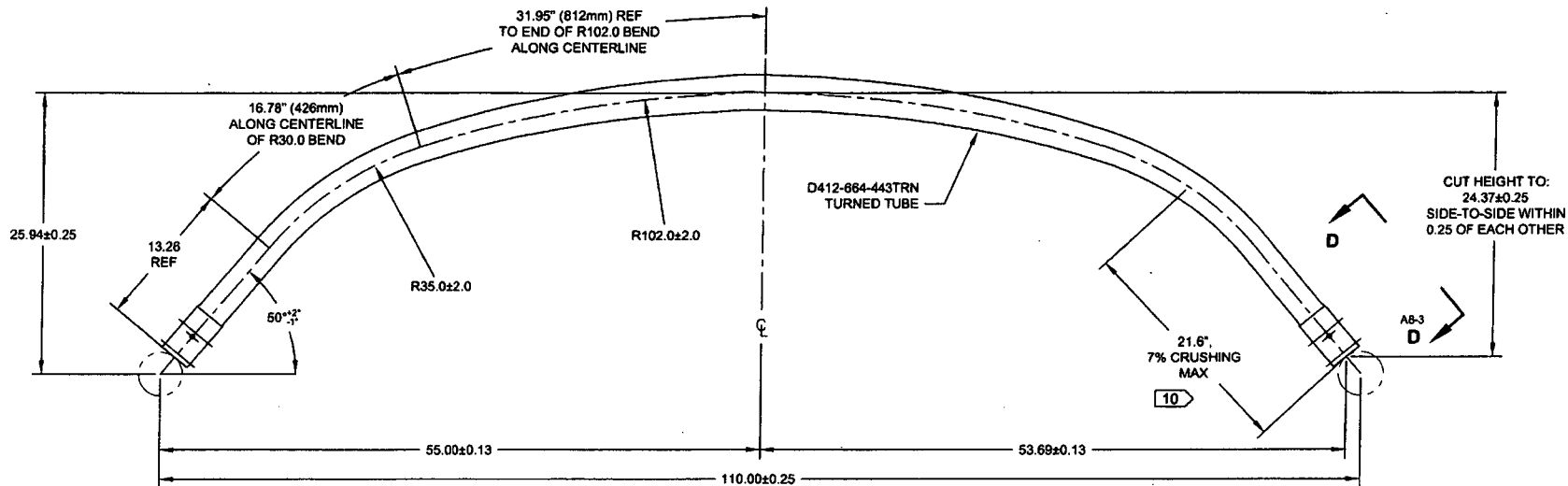
SECTION A-A C6-2
SCALE 4X

UNDER REVIEW
9/14/14 11/16/14

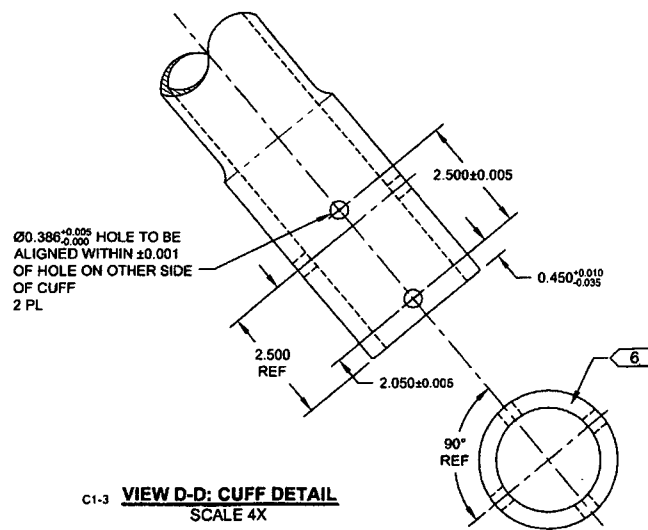
RELEASED
2014-05-26

UNDER REVIEW
9/15/14

DESIGN		DART AEROSPACE LTD	
DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. A
MFG. APPR.		D412-664-443	SHEET 2 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE ASSY (412 HI AFT)	NTS
DATE	14.04.01	COPYRIGHT © 2013 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	



D412-664-443BND 10
BENDING DETAIL



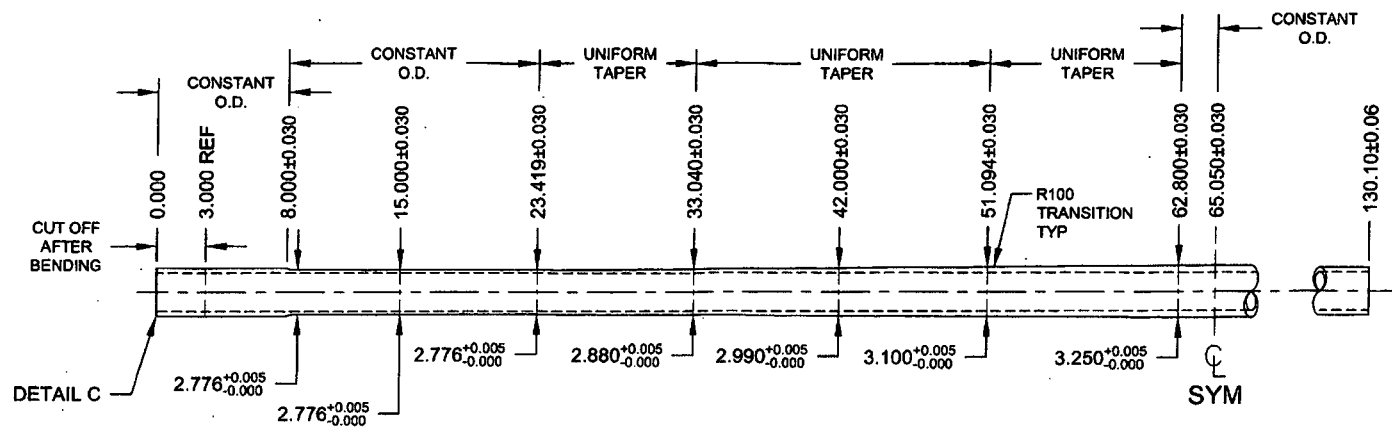
C1-3 **VIEW D-D: CUFF DETAIL**
SCALE 4X

OK
P. 11/14
UNDER REVIEW
11/7/36

UNDER REVIEW
P. 15/14/24

RELEASED
2014-05-26
MND

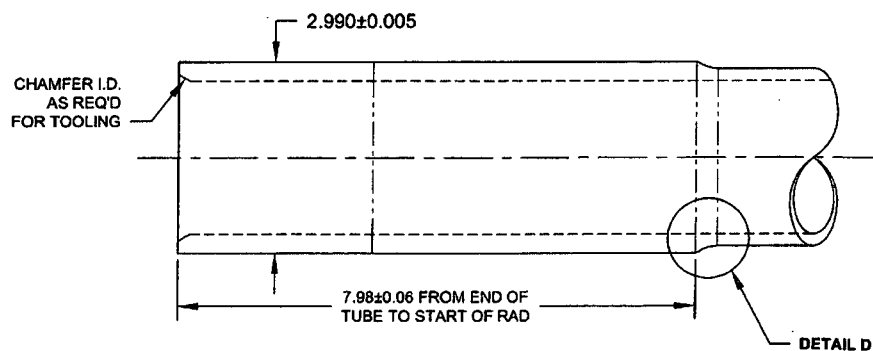
DESIGN	P	DART AEROSPACE LTD	
DRAWN	P	HAWKESBURY, ONTARIO, CANADA	
CHECKED	DW	DRAWING NO.	REV. A
MFG. APPR.		D412-664-443	SHEET 3 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE ASSY (412 HI AFT)	NTS
DATE	14.04.01	COPYRIGHT © 2013 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL. NO DISSEMINATION OR REPRODUCTION IS PERMITTED WITHOUT THE WRITTEN PERMISSION OF DART AEROSPACE LTD.	



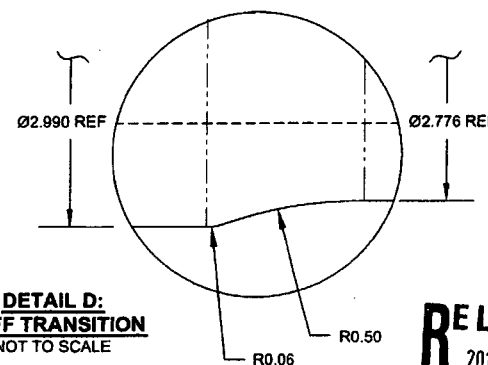
D412-664-443TRN
TURNING DETAIL

UNDER REVIEW

UP 15/14/20



DETAIL C:
CUFF TRANSITION
SCALE 4X



DETAIL D:
CUFF TRANSITION
NOT TO SCALE

RELEASED
2014-05-26

DESIGN	9	DART AEROSPACE LTD	
DRAWN	9	HAWKESBURY, ONTARIO, CANADA	
CHECKED	DL	DRAWING NO.	REV. A
MFG. APPR.		D412-664-443	SHEET 4 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
DATE	14.04.01	COPYRIGHT © 2013 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSES OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

DQA:

Date: 16/02/09



QA Closed

Date: 16/02/09

WORK ORDER NON-CONFORMANCE / UPDATE

Work Order update only ☐

Work Order: 137870		DISPOSITION		AGAINST DEPARTMENT/PROCESS			
Part No. 0412664-403		Rework ☒	Skid-tube ☐	Cross tube ☒	Water Jet ☐	Engineering ☒	
NCR No. 16-5566		Scrap ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	
		Use-as-is ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	
Suspected Unapproved ☐		Large Fab ☐	Composite ☐	Supplier ☐			
Date: 15/10/19	Step #: 200	QTY Effective: 1				MRB (QSI042) Approval	
Description Work Order Deviation		Disposition				DAS 12 15/10/19	
USE AXALTA PRE-TREATMENT PER QSI 005		Axalta B205S B/N: 132520				DAS Completed By 41 15-10-28	
Too sticky improve adhesion of print		Axalta Metabak 236S B/N: 132474				Lead hand / Supervisor DAS 9 9-89	
						Approval Verification 9 9-89	
						DEC 03 2015	
						DAS / QA Coordinator 9 9-89	
						Approval 9 9-89	
						DEC 03 2015	
Root Cause		FAULT CATEGORY					
Environment ☐	No Re-verification ☐	Pressure/Forced ☐	Temperature/Cure ☐	Power Loss/Surge ☐	Positioned Wrong ☐		
Design ☐	Operator ☐	Bending ☐	Set-up ☐	Folio/Program ☐	Outside Dimensions ☐		
Doc/Data ☐	Offset/Setup ☐	Centre Not Concentric ☐	BOM/Route ☐	Grain ☐	Over/Under tolerance ☐		
Equip/Tooling ☐	Supplier ☐	Cracks ☐	Broken/Damage/Defect ☐	Weld ☐	Part Incorrect ☐		
Handling/Pre ☐	Training ☐	Crimp/Kink/Ripple/Wave ☐	Inspection Incomplete/Unqualified ☐	Wrong Stock Pulled ☐	Part Lost/Missing ☐		
Material ☐	Use for Testing ☐	Cuffs ☐	Contamination ☐	Out of Sequence ☐	Part Moved ☐		
Internal Transport ☐	Poor Information ☐	Crushing ☐	Countersink ☐	Off-set ☐	Drawing ☒		
Tribal Knowledge ☐	Rushing ☐	Heat Treat ☐	Cut Too Short ☐	Mislabeled ☐	Finish ☐		
LOA ☐	Product Improvement ☒	Wave/Twist in Tube ☐	Instructions Incomplete/Unclear ☐	Fit/Function ☐	Misread ☐		
Substation ☐	Process Improvement ☐	Marks/Chatter ☐	Drill Holes ☐	Misaligned/off center ☐	Turning Sequence ☐		
Past Expiry Date ☐	Manufacturing Process ☐						
Misidentified ☐	Past Due ☐	OTHER :					

D412-664-403 Stainless Steel Hardened Crosstube

TRN # 132 989

setup

3.25" rollers

Bend lines are @ 32", 35" from centerline of tube

1.75" shims are used in the buggy for side bends

Middle Bend

Middle bend goes from 35" line with crosstube being on the large table of the machine.

Approach for middle bend is 2870 on both rollers. Run programs middle auto, middle 6 check.

Side Bends

Run programs side 1-10 down the taper from 32" tangent line. Approach is 2900 on Y roller and 3385 on W roller. Programs 1-5 go back to the tangent line ready for next bend. Program 6-10 release at the end. Approaches on programs 6-10 are on the first line of programs... Programs 11-15 run down taper for 9" then come back up to finish tube slowly, be careful with these programs...

Enjoy

Notes:

13/12/12 ran 1 tube, program middle 6 was not enough, prog middle 7 overbent slightly. will create middle 6b to be a halfway point. after program 7 we ran the tube as per folio. one side finished nicely at program 10, the opposite side finished nicely after running program 1 2 times, then 13 to finish. this left the tube closer to max tolerance on the span, 53.730/53.800.

15/06/03 middle auto has been made but, due to the long program, only contains programs 1-5. program 6 must be run separately prior to checking tube on wall.

2	MAuto	2
4	6	4
6	7	6
7		7
—		—



Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Tel: 613 632 9577
Fax: 613 632 1053

PURCHASE ORDER

Purchase Order ID **PO00242**

Purchase Order Date 10/23/2015

PO Print Date 10/23/2015

Page Number 2 of 3

Order From :

VC-SKY001

SKYSERVICE
6120 MIDFIELD ROAD
MISSISSAUGA, ONTARIO L5P 1B1
CANADA

Ship To : DART AEROSPACE LTD
1270 ABERDEEN
HAWKESBURY, ON K6A 1K7
CANADA

Contact Name

Vendor Phone 905-678-5636

Ship To Contact

Ship To Phone

Ship Via: Delivered

Ship Acct:

Buyer

Chantal Lavoie

Customer POID

Customer Tax # 10127-2607

Terms

Net 30

Currency

CAD

FOB

FCA - (Free Carrier)

3	133190	D212-664-207 CROSSTUBE	10/23/2015	1.00	\$135.00	\$135.00
---	--------	---------------------------	------------	------	----------	----------

Yes

10/23/2015

LIQUID PENETRANT INSPECTION AS PER QSI 038 OR
LPI AS PER ASTM 1417 LEVEL 2

Line Total: \$135.00

4	137312	D412-664-403 CROSSTUBE	10/23/2015	1.00	\$135.00	\$135.00
---	--------	---------------------------	------------	------	----------	----------

Yes

10/23/2015

LIQUID PENETRANT INSPECTION AS PER QSI 038 OR
LPI AS PER ASTM 1417 LEVEL 2

Line Total: \$135.00

5	137870	D412-664-403 CROSSTUBE	10/23/2015	1.00	\$135.00	\$135.00
---	--------	---------------------------	------------	------	----------	----------

Yes

10/23/2015

LIQUID PENETRANT INSPECTION AS PER QSI 038 OR
LPI AS PER ASTM 1417 LEVEL 2

Note:

10/23/2015



skyservice Work Order Traveler

Sky Service F.B.O. Inc.

DOT APP 53-89 / EASA 145.7142 / BDA AMO 385

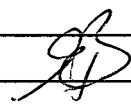
WO #: MWO26184	Customer: Dart Aerospace Ltd.	Dept: NDT YUL	Reference: 30242
Descr:	PN:	S/N:	Qty: 1
Make:	Model:	Reg:	A/C S/N:
TSN:	CSN:	TSO:	
Task: UNSCHEDULED			Sequence: 1

Work Required:

CARRY OUT NDT ON 6 CROSSTUBES AS PER PO30242

4 STAINLESS STEEL CROSSTUBES, ITEM ID# D412-664-403 , WORK ORDER ID# 137312, 137870, 137871, 137872

2 AFT CROSSTUBES , ITEM ID# D212-664-207 , WORK ORDER ID# 136262, 133190

Action Taken:						Date:	Initial/Stamp:
LPI C/O IAW ASTM E-1417M-13 ***NO CRACK FOUND*** PEN. ZL-56, MPO13600, UV M-20141, CLEANER SKC-S MPO13923 , DEV. MPO11715						OCT 23 2015	 
Description	Location	P/N	Qty	Batch	S/N Off	S/N On	
							
		15-10-29					

I certified that the maintenance described above has been performed in accordance with the applicable standard of airworthiness.

Signature:	ACA/SCA Stamp	Date:
Name: RAFIK MELIKIAN		OCT 23 2015